Chapter 1: Biology in the 21st Century

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What is inquiry?

What is the goal of science?

1.3 Scientific Thinking and Processes

I. Like all science, Biology is the process of inquiry

A. The goal of science is to…

1. investigate and understand
2. explain events
3. and make useful predictions

…about the natural world.

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How is science done?

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How do we observe our world?

B. Scientific inquiry

1. begins with **observations** – using our 5 senses to study the world

WRITE: *Write three observations of the photo.*

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What are the types of data?

How do qualitative and quantitative data compare?

2. collects **data** from our observations

a. Qualitative data – descriptions of qualities

b. Quantitative data – numbers, counts, and measurements

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What is a hypothesis?

What makes a good hypothesis?

What makes a bad hypothesis?

3. based on our observations and data forms a **hypothesis** – a proposed answer for a scientific question that is testable

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Why must a hypothesis be testable?

4. test the hypothesis, by collecting and analyzing the data
   - If the data supports the prediction, the hypothesis is valid
   - If the data does not support the hypothesis, it is rejected

THINK:

Is it enough just to test a hypothesis once?

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What makes a good experiment?

What is an independent variable?

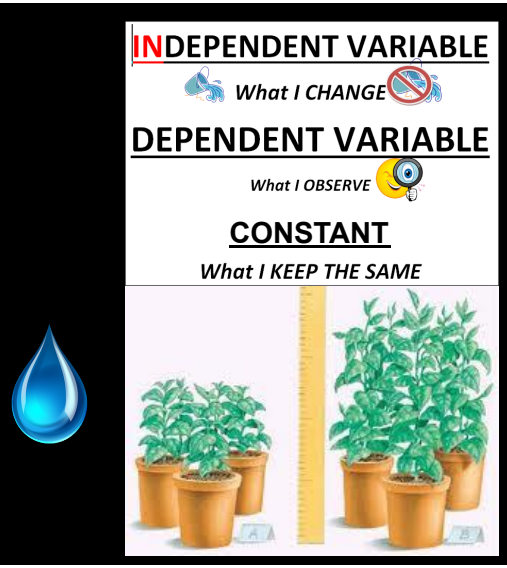
What is a dependent variable?

What is a constant?

II. Biologist use **experiments** to test hypotheses

A. All experiments have:

1. **Independent variable** – manipulated or changed
2. **Dependent variable** – changes in response to independent variable
3. **Constant** – the conditions that do not change in the experiment



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What is a theory?

Can theories change?

III. A **theory** is a proposed explanation for an event

THINK-WRITE-PAIR-SHARE:

What makes a good theory?

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SO….. Which of these situations can be investigated by science and what questions might you ask to help you further understand the situation?

1. Your computer will not turn on.
2. Vanilla ice cream is better than chocolate.
3. Science is hard.
4. Humans and chimpanzees evolved from a common ancestor.
5. What happens when we die?

Can science be used to answer all questions?

Science **IS NOT** used to answer all questions, particularly about issues like morals, ethics and opinions.